Process, Assessment, Outcome (PAO) Workshop Application

The Montana Office of Public Instruction's (OPI) Assessment Division, is bringing together a group of science educators to review high-quality aligned assessment items and identify cohesive item sets and instructional strategies to meet the Montana Science Standards. Montana adopted new science standards in September of 2016 and they align with the Next Generation Science Standards (NGSS). As teachers make the transition to instruction aligned to NGSS, formative assessment will be an essential tool to ensure that instruction meets student need.

Through using assessments in this formative way teachers will have instruction that is guided by, and responsive to, information they have about their students. The product(s) of this workshop will be to provide elementary and secondary educators with access to high-quality items, item sets, and instructional strategies teachers can use to dig deeper into the standards.

Deadline extended: This form closes on Monday, April 24th at 9:00 am.

1. Name (First and Last Name):
2. Preferred Email:
3. Phone:
4. Present or most recent employer: For example: school name, organization, etc.
5. School City: If you are not currently teaching, indicate the city you live in.
6. Present or most recent teaching assignment: For example: I taught high school biology in a rural class A school.
7. Please tell us your highest degree attained, any endorsements you have, and the core concentration of your education.

8. Do you have any specialized training or expertise? (e.g., IEFA, LEP, ESL, SWD, etc.)

9. Please indicate the subjects you have taught and how many years of experience you have in each.

	Years 0 - 1	Years 1.1 - 5	Years 5.1 - 10	Years 10.1-15	Years 15 +	Pre-service training only.	None.
Elementary science	○	○	○	○	○	○	○
Astronomy	○	○	○	○	○	○	○
Biology	○	○	○	○	○	○	○
Chemistry	○	○	○	○	○	○	○
Computer science	○	○	○	○	○	○	○
General Biology	○	○	○	○	○	○	○
Earth Science	○	○	○	○	○	○	○
Engineering	○	○	○	○	○	○	○
Geology	○	○	○	○	○	○	○
Physics	○	○	○	○	○	○	○
Other Biological Science	○	○	○	○	○	○	○
Other Physical Science	○	○	○	○	○	○	○
Other Earth Science	○	○	○	○	○	○	○

10. Please indicate the grades you have taught and how many years of experience you have in each.

	Years 0 - 1	Years 1.1 - 5	Years 5.1 - 10	Years 10.1-15	Years 15 +	Pre-service training only.	None.
Early childhood	○	○	○	○	○	○	○
Kindergarten	○	○	○	○	○	○	○
Grade 1	○	○	○	○	○	○	○
Grade 2	○	○	○	○	○	○	○
Grade 3	○	○	○	○	○	○	○
Grade 4	○	○	○	○	○	○	○
Grade 5	○	○	○	○	○	○	○
Grades 6 - 8	○	○	○	○	○	○	○
Grades 9-10	○	○	○	○	○	○	○
Grades 11- 12	○	○	○	○	○	○	○
Undergraduate level	○	○	○	○	○	○	○
Graduate level	○	○	○	○	○	○	○

11. What activities, professional development, and/or trainings have you participated in that involve the Next Generation Science Standards (NGSS), the Framework for K – 12 Science Education, and/or Montana Science Standards (2016).

12. Select your degree of comfort with using and/or navigating Next Generation Science Standards (NGSS), the Framework for K – 12 Science Education, and/or Montana Science Standards (2016):

☐	☐	☐	☐	☐
1- Novice – very comfortable.	2	3	4	5-Highly familiar – very comfortable.

13. Please rate yourself in the following areas by checking the appropriate level for each skill:

	3 = Strong Skills. Extensive experience in this area.	2 = Moderate Skills. Some experience in this area.	1 = Novice. Limited experience in this area.
Collaboration: Working with Others	○	○	○
Critical thinking and Problem-Solving	○	○	○
Adaptability	○	○	○
Accessing and Analyzing Information	○	○	○
Initiative and Perseverance	○	○	○
Facilitation Skills	○	○	○
Communication Skills (Verbal and Written)	○	○	○

14. For this workshop, what area are you interested in evaluating?

- ☐ Elementary Science (K-2)
- ☐ Elementary Science (3-5)
- ☐ MS-Life Science
- ☐ MS-Earth and Space Science
- ☐ MS-Physical Science
- ☐ HS-Life Science
- ☐ HS-Earth and Space Science
- ☐ HS-Physical Science

15. If selected for this workshop, select your future interests in Montana Science Standard work:

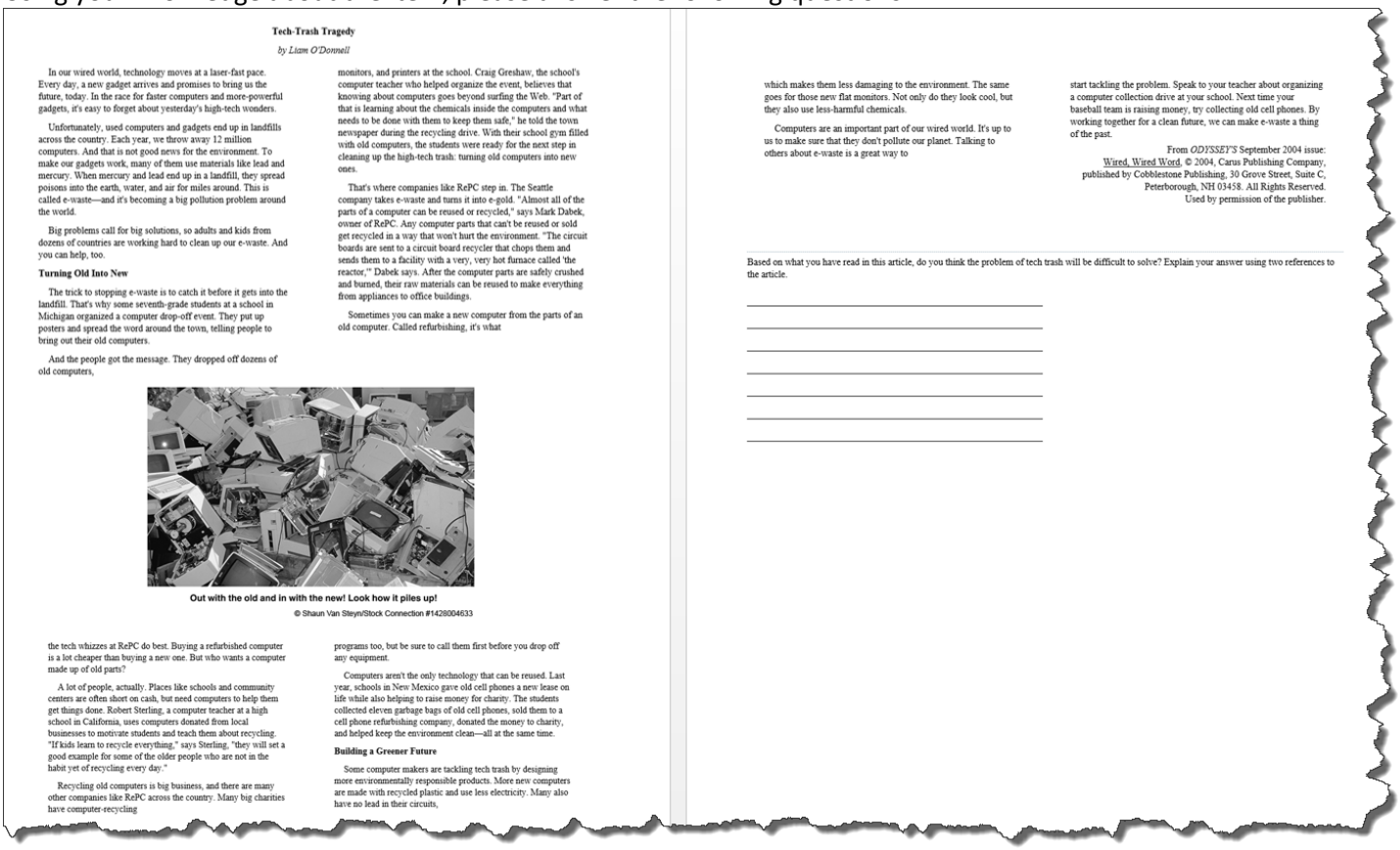
- ☐ I'm interested in being a teacher leader (e.g., school, district, and statewide).
- ☐ I'm interested in developing online content for the Teacher Learning Hub.
- ☐ I'm interested in developing items for Montana's statewide summative science assessment.
- ☐ I'm interested in reviewing items for Montana's statewide summative science assessment.
- ☐ I'm interested in submitting my own assessments (formative and interim) for statewide use.
- ☐ I'm interested in being involved in anything related to science at the state.
- ☐ I'm not interested in any other activities at this time.

16. If selected, please describe how your participation in this work will continue to serve your career interests and professional growth.
17. If selected, what are some ways (after the workshop) you plan to use this experience in your practice and/or share this experience with others.

Deconstruct - Align - Apply

For Questions 1 – 15, please use A Framework for K – 12 Science Education or http://nextgenscience.org. You may download a free PDF of the A Framework for K – 12 Science Education at https://www.nap.edu/catalog/13165/a-framework-for-k-12-science-education-practices-crosscutting-concepts.

The below item may be outside your expertise but use the supports provided to deconstruct the item. Selected participants will be matched with their content area and expertise. For more information about the item, please visit: http://nces.ed.gov/nationsreportcard/itmrlsx/portal.aspx?type=display&questionlist=2011-8R13:7&index=1&tab=ques
Using your knowledge about the item, please answer the following questions.



Tech-Trash Tragedy

by Liam O'Donnell

In our wired world, technology moves at a laser-fast pace. Every day, a new gadget arrives and promises to bring us the future, today. In the race for faster computers and more-powerful gadgets, it's easy to forget about yesterday's high-tech wonders.

Unfortunately, used computers and gadgets end up in landfills across the country. Each year, we throw away 12 million computers. And that is not good news for the environment. To make our gadgets work, many of them use materials like lead and mercury. When mercury and lead end up in a landfill, they spread poisons into the earth, water, and air for miles around. This is called e-waste—and it's becoming a big pollution problem around the world.

Big problems call for big solutions, so adults and kids from dozens of countries are working hard to clean up our e-waste. And you can help, too.

Turning Old Into New

The trick to stopping e-waste is to catch it before it gets into the landfill. That's why some seventh-grade students at a school in Michigan organized a computer drop-off event. They put up posters and spread the word around the town, telling people to bring out their old computers.

And the people got the message. They dropped off dozens of old computers, monitors, and printers at the school. Craig Gresham, the school's computer teacher who helped organize the event, believes that knowing about computers goes beyond surfing the Web. "Part of that is learning about the chemicals inside the computers and what needs to be done with them to keep them safe," he told the town newspaper during the recycling drive. With their school gym filled with old computers, the students were ready for the next step in cleaning up the high-tech trash: turning old computers into new ones.

That's where companies like RePC step in. The Seattle company takes e-waste and turns it into e-gold. "Almost all of the parts of a computer can be reused or recycled," says Mark Dabek, owner of RePC. Any computer parts that can't be reused or sold get recycled in a way that won't hurt the environment. "The circuit boards are sent to a circuit board recycler that chops them and sends them to a facility with a very, very hot furnace called 'the reactor,'" Dabek says. After the computer parts are safely crushed and burned, their raw materials can be reused to make everything from appliances to office buildings.

Sometimes you can make a new computer from the parts of an old computer. Called refurbishing, it's what the tech whizzes at RePC do best. Buying a refurbished computer is a lot cheaper than buying a new one. But who wants a computer made up of old parts?

A lot of people, actually. Places like schools and community centers are often short on cash, but need computers to help them get things done. Robert Sterling, a computer teacher at a high school in California, uses computers donated from local businesses to motivate students and teach them about recycling. "If kids learn to recycle everything," says Sterling, "they will set a good example for some of the older people who are not in the habit yet of recycling every day."

Recycling old computers is big business, and there are many other companies like RePC across the country. Many big charities have computer-recycling programs too, but be sure to call them first before you drop off any equipment.

Computers aren't the only technology that can be reused. Last year, schools in New Mexico gave old cell phones a new lease on life while also helping to raise money for charity. The students collected eleven garbage bags of old cell phones, sold them to a cell phone refurbishing company, donated the money to charity, and helped keep the environment clean—all at the same time.

Building a Greener Future

Some computer makers are tackling tech trash by designing more environmentally responsible products. More new computers are made with recycled plastic and use less electricity. Many also have no lead in their circuits, which makes them less damaging to the environment. The same goes for those new flat monitors. Not only do they look cool, but they also use less-harmful chemicals.

Computers are an important part of our wired world. It's up to us to make sure that they don't pollute our planet. Talking to others about e-waste is a great way to start tackling the problem. Speak to your teacher about organizing a computer collection drive at your school. Next time your baseball team is raising money, try collecting old cell phones. By working together for a clean future, we can make e-waste a thing of the past.

Out with the old and in with the new! Look how it piles up!

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Based on what you have read in this article, do you think the problem of tech trash will be difficult to solve? Explain your answer using two references to the article.

1. What grade-band is most applicable to this item? Please select the best option.

- ☐ Grades K-2
- ☐ Grades 3-5
- ☐ Grades MS (i.e., 6-8)
- ☐ Grades HS (i.e., 9-12)

2. Identify the Disciplinary Core Ideas students must understand. Select all relevant concepts. (Description of Disciplinary Core Ideas on Framework pages 103 – 214). NGSS at: http://nextgenscience.org/sites/default/files/resource/files/Appendix%20E%20-%20Progressions%20within%20NGSS%20-%20052213.pdf

- ☐ PS1: Matter and its interactions
- ☐ PS2: Motion and stability: Forces and interactions
- ☐ PS3: Energy
- ☐ PS4: Waves and their applications in technologies for information transfer
- ☐ LS1: From molecules to organisms: Structures and processes
- ☐ LS2: Ecosystems: Interactions, energy, and dynamics
- ☐ LS3: Heredity: Inheritance and variation of traits
- ☐ LS4: Biological evolution: Unity and diversity
- ☐ ESS1: Earth's place in the universe
- ☐ ESS2: Earth's systems
- ☐ ESS3: Earth and human activity
- ☐ ETS1: Engineering design
- ☐ ETS2: Links among engineering, technology, science, and society

3. Identify the Crosscutting Concepts students must understand. Select all relevant concepts. (Description of Crosscutting Concepts on Framework page 84). NGSS at: http://nextgenscience.org/sites/default/files/resource/files/Appendix%20G%20-%20Crosscutting%20Concepts%20FINAL%20edited%204.10.13.pdf

- ☐ Patterns
- ☐ Cause and effect: Mechanism and explanation
- ☐ Scale, proportion, and quantity
- ☐ Systems and system models
- ☐ Energy and matter: Flows, cycles, and conservation
- ☐ Structure and function
- ☐ Stability and change

4. Identify the Science and Engineering Practices students must use. Select all relevant practices. (Description of Practices on Framework pages 50 – 53). NGSS at: http://nextgenscience.org/sites/default/files/resource/files/Appendix%20F%20%20Science%20and%20Engineering%20Practices%20in%20the%20NGSS%20-%20FINAL%20060513.pdf

- ☐ Asking questions (for science) and defining problems (for engineering)
- ☐ Developing and using models
- ☐ Planning and carrying out investigations
- ☐ Analyzing and interpreting data
- ☐ Using mathematics and computational thinking
- ☐ Constructing explanations (for science) and designing solutions (for engineering)
- ☐ Engaging in argument from evidence
- ☐ Obtaining, evaluating, and communicating information

5. Identify the corresponding Montana Performance Standard for this item.
(e.g., NGSS Performance Expectation, K-2-ETS1).

6. What is the focus or skills being emphasized by this item? Identify an NGSS Evidence Statement from http://nextgenscience.org/evidence-statements that provides observable features of student knowledge and skill(s). Provide one claim statement for this item below:

7. Select the degree of alignment to the Montana Performance Standard. How well does this item "fit" the Montana Performance Standard? Please select the best option.

- ☐ **Full alignment.** This question clearly belongs in this standard.
- ☐ **Strong partial alignment.** This item may belong in this standard; however, there is one or more aspects of the item that does not fit well.
- ☐ **Weak partial alignment.** There is some overlap with the standard but it is a stretch and we cannot find a better standard.
- ☐ **No alignment.**

8. Must your 3-Dimensional selection match exactly the Montana Performance Standard/NGSS performance expectation in order to be aligned? Explain your thinking about item alignment.

9. Cognitive Rigor. What is the Depth of Knowledge (DOK) for this item? Please select the best option. Resource at: https://drive.google.com/file/d/0B34l3UA3OHHnLU80UWhNLW83YWM/view?usp=sharing

- ☐ Level 1-Recall
- ☐ Level 2- Skills & Concepts/ Basic Reasoning
- ☐ Level 3- Strategic Thinking/ Complex Reasoning
- ☐ Level 4- Extended Thinking

10. Cognitive Rigor. What is the Bloom's Taxonomy for this item? Please select the best option. Resource at: https://drive.google.com/file/d/0B34l3UA3OHHnLU80UWhNLW83YWM/view?usp=sharing

- ☐ Remember (Level 1)
- ☐ Understand (Level 2)
- ☐ Apply (Level 3)
- ☐ Analyze (Level 4)
- ☐ Evaluate (Level 5)
- ☐ Create (Level 6)

11. Explain if there is any connection to Montana's Math Standards and/or the math practices. If a connection exists, identify what content and/or skills are being reinforced. Math practice resource located at: http://nstahosted.org/pdfs/ngss/PracticesVennDiagram.pdf
(e.g., the mathematical practice "reason abstractly and quantitatively", etc.).

12. Explain if there is any connection to Montana's English Language Arts Standards and/or the ELA student capacities. If a connection exists, identify what content and/or skills are being reinforced. Student capacities resource located at: http://nstahosted.org/pdfs/ngss/PracticesVennDiagram.pdf
(e.g., "engage in argument from evidence", etc.)

13. Describe a formative assessment and/or strategy that can be used with students to ensure their understanding of this standard (e.g., pre/post-tests, exit slips, student-generated test questions, one minute summary, etc.)
14. Describe how this item may be developed to include or how it already includes an authentic learning experience for students (e.g., cultural significance, place-based, etc.)
15. How could this item or topic be modified to meet the needs of multiple learning styles and/or abilities? (e.g., heterogeneous grouping, think-pair-share, KWL charts, etc.)

Thank you for your interest in this summer workshop!

Application screening begins April 10th & selections will be made by April 21st.
We will inform all applicants of our participant decisions after April 21st.